

XXII. *Note on the habits of Chironomus (Orthocladius) sordidellus.* By THOMAS HAROLD TAYLOR, M.A., F.E.S.

[Read October 7th, 1903.]

THE larva of this insect lives submerged in brisk streams. It has the usual structure of a bloodworm, but like other surface-feeding *Chironomus*-larvæ, it is greenish in colour, and lacks the ventral gills on the last segment but one. When full-grown it measures 7 mm. in length. This larva constructs for its abode a hollow cylindrical tube, one end of which it attaches to the surface of a stone, leaving the other end free and open. The material of the tube is furnished by the secretion of the salivary glands without any admixture of foreign substances. Within the long and flexible silken tube the larva may be seen creeping to and fro, or, if stationary, bending its body up and down in the undulations often practised by tube-dwelling larvæ, as a means of renewing water which has been vitiated by respiration. Pure water is admitted by special inlets, which may be either mere slits or roundish holes. The food of the larva consists of unicellular and filamentous algæ. Although these grow in abundance on the stones around, the strength of the current, and the incessant oscillations of the tube make it a matter of some difficulty for the larva to browse upon them. But since the tube itself soon becomes overgrown with diatoms and other microscopic algæ, the larva, thrusting its head out of the terminal opening and holding on by its anal feet, is able to search the exposed surface of its own tube. The range of its body is of course very small, but the tube is flexible, and admits of being bent upon itself or even doubled in two. By reaching out, the larva can draw up to its mouth any part of the surface of its tube, which thus not only affords lodging, but board as well.

When the larva is full-grown, it transforms the old tube into a pupal case. It retains the free end for its abode, and converts the rest into an anchoring strand by drawing the sides together with threads of silk. The free end becomes dilated into an oval chamber, the terminal aperture of which is somewhat more narrowed than in the

larval dwelling. The last thing the larva does before pupation is to make a new aperture at the fixed end, which may be distinguished as the front opening. This aperture is seldom single; generally two, three or even four small circular holes are arranged in a ring around the attachment of the stalk. The advantage of several small holes over one large one is obvious; they do not weaken the strand so much, nor are they so liable to be torn by the force of the stream. When all is ready the larva pupates; the old larval skin is usually allowed to float out of the tube, for it is seldom seen afterwards.

The pupa of this species of *Chironomus* has minute prothoracic horns in which no apertures are visible, and an effective tail-fin. It lies in the chamber with its head towards the attached end, that is, pointing up-stream. It maintains an undulatory movement with its body, which causes water to be drawn in at the front opening and passed out behind. As the front opening looks up-stream and the hinder down-stream, it follows that the course of the respiratory current is parallel to and in the same direction as the flow of the stream. When, in the course of a few days, the fly is ready to emerge, the pupa, by means of the hooks on its body, forces a way through the front opening. It then rises to the surface of the water, when the skin at once splits open along the back and allows the fly to escape.

It frequently happens that while the pupa is still within its case, the six-legged larva of a water-mite is found attached to its body, generally on the upper part of the thorax.

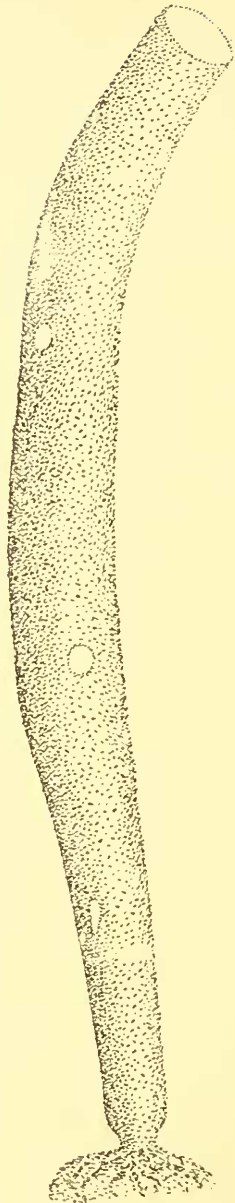


Fig. 1. Larval tube of *Chironomus* (*Orthocladus*) *sordidellus* $\times 8$.

Its colour, which is bright red, renders the mite conspicuous even through the wall of the tube. The mite does not appear to do any injury to its host, even when, as sometimes occurs, two are present on the same pupa. It has not been seen upon the larva. When the pupa is extricating itself from its chamber, the mite occasionally becomes dislodged, and is left behind, evidently ill at ease, as its agitated movements show. Generally, however, the mite is carried up to the surface of the water together with the pupa itself. And then an unexpected thing happens. One might imagine that when the fly emerges, the mite would remain attached to the pupal skin; but such is not the case. When the pupa rises to the surface, the mite is apparently aware of what is going on, and, all alert, at the very moment when the old skin cracks, it releases its hold and transfers itself to the body of the half-extricated fly. It is interesting to watch the mite, hitherto perfectly passive, execute this rapid and sudden movement. Thus when the fly leaves the water and rises into the air, the mite, still a six-legged larva, is borne along with it. The ultimate fate of the mite can only be guessed at.

My best thanks are due to Professor Miall for his valuable assistance during the preparation of this note.

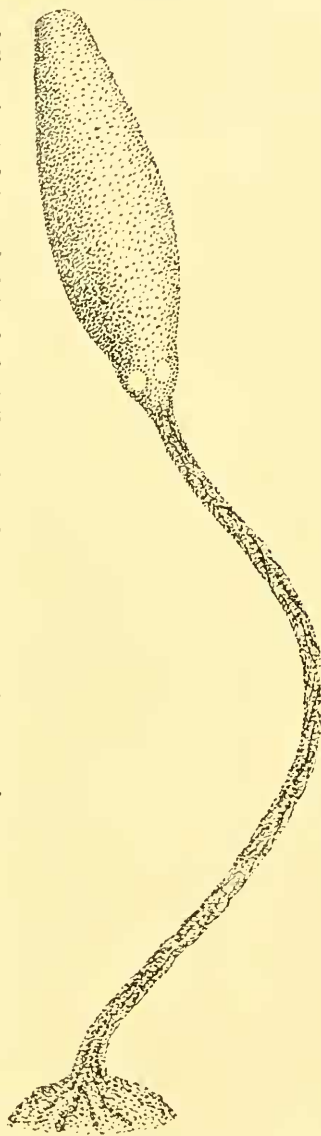


Fig. 2. Pupal tube of *Chironomus (Orthocladius) sordidellus* $\times 8$.